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Continuation-in-Part Application  
Applicant: John R. Cowen  
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Serial No.: 10/162,104 filed on June 3, 2002  
For: PIVOTAL JOYSTICK BASE  
Examiner:  
Art Unit:

## **PIVOTAL JOYSTICK BASE**

### **CROSS REFERENCE TO RELATED APPLICATION**

This application claims the benefit of provisional application filed October 24, 2002 and is a continuation in part of application number 10/162,104, filed June 3, 2002.

### **BACKGROUND OF THE INVENTION**

This invention relates to pivotal positioning of joystick bases for powered wheelchairs and other mechanisms.

Joysticks for controlling powered wheelchairs generally extend forwardly  
5 from armrests where the joysticks and joystick assemblies often obstruct desirable closeness of the wheelchairs and occupants thereof to tables, desks, workstations and other structures. There are no known adjusters of distance and lateral positioning of joystick bases from the armrests to allow closeness of the powered wheelchairs to desired objects conveniently, reliably and inexpensively in a manner taught by  
10 this invention.

The present invention provides a swivelling pivotal joystick base which has two plates, one attached to an extension on an arm of a wheelchair which allows the joystick to be swivelled to a 90 degree position and a second plate pivotally attached at the distal end of the first plate which allows the joystick attached there to swivel

into a position in line with the arm of the wheelchair. The addition of this second plate is important as it enables the joystick to be placed in a position in line with the normal forward orientation of the joystick so that a user does not incorrectly direct the wheelchair in an undesired direction.

5           Examples of most-closely related known but different devices are described in the following patent documents:

	<u>U.S. Patent No.</u> (U.S. unless stated otherwise)	<u>Inventor</u>	<u>Filing Date</u>
10	5,326,063	Stevens	07-05-1994
	5,893,607	Trimnell	04-13-1999
	6,086,156	Breen, <i>et al.</i>	07-11-2000
	5,169,210	Fricano	12-08-1992
	6,352,302	Piretti, Jr.	03-05-2002
	5,026,114	Miller	06-25-1991
15	5,954,393	Perrin	09-21-1999
	5,947,501	Osborn	09-07-1999

## SUMMARY OF THE INVENTION

Objects of patentable novelty and utility taught by this invention are to provide a pivotal joystick base which:

20           allows a forwardly obstructive joystick assembly to be moved conveniently to a non-obstructive position laterally to a side of a chair member to which the joystick base is attached pivotally;

provides locking of the joystick base in the non-obstructive position for operation of the joystick in a non-obstructive position;

provides linear positioning of the joystick base from the chair member;

5 provides directional positioning of a joystick assembly in line with the arm of a wheelchair in order to maintain the original orientation of the joystick controls so as to prevent inadvertent and an incorrect movement of the wheelchair;

provides directional positioning of a joystick assembly on the  
10 joystick base selectively; and  
is inexpensive.

This invention accomplishes this and other objectives with a swivelling pivotal joystick base having two plates, a first plate attached to a wheelchair arm extension and a second plate which is pivotally attached at a distal end of the first plate on  
15 which the joystick control is attached. The arm extension has a spring-loaded locking ball at its end forward of the pivoting point of the first plate. The locking ball which trunnions into a divot in the bottom of the first plate in order to maintain the joystick in a forward position during normal use. A stop bar on the arm extension prevents the first plate from pivoting inward of a normal position. In

addition, a stop piece mounted on the first plate extends upward sufficiently to stop the second plate on which the joystick is mounted from pivoting beyond the forward position when in use. Further, a spring-loaded locking ball in the first plate also trunnions into the bottom of the second plate when the second plate is in a forward use position to keep the joystick in the second plate from inadvertently rotating from the forward position.

The above and other objects, features and advantages of the present invention should become even more readily apparent to those skilled in the art upon a reading of the following detailed description in conjunction with the drawings wherein there is shown and described illustrative embodiments of the invention.

## BRIEF DESCRIPTION OF DRAWINGS

This invention is described by appended claims in relation to description of a preferred embodiment with reference to the following drawings which are explained briefly as follows:

**FIG. 1** is a side elevation view of a pivotal joystick base having a pivot lock with a spring-pressured member and mounted on a dashed-line representation of a motorized wheel chair;

**FIG. 2** is a partially cutaway and expanded view of the pivotal joystick base shown in **FIG. 1**;

**FIG. 3** is a front elevation view of the dashed-line representation of the motorized wheelchair on which the **FIG. 1** pivotal joystick base is positioned with  
5 a dashed-line representation of a joystick base pivoted laterally to a side;

**FIG. 4** is an expanded fragmentary top view of the **FIG. 1** pivotal joystick base pivoted laterally;

**FIG. 5** is a bottom view of the **FIG. 4** illustration;

**FIG. 6** is a partially cutaway side elevation view of the pivotal joystick base  
10 having a pivot lock with a pivot lock having a latch that is movable downwardly from a latch knob to a latch notch proximate a base pivot;

**FIG. 7** is an expanded fragmentary top view of the **FIG. 6** pivotal joystick base with a dashed-line representation of the base bar pivoted laterally from an armrest of the motorized wheelchair;

15 **FIG. 8** is a partially cutaway and expanded fragmentary side view of the pivot lock of the **FIG. 6** illustration;

**FIG. 9** is a partially cutaway and expanded fragmentary top view of the pivot end of the base rod of the **FIG. 6** embodiment;

**FIG. 10** is a partially cutaway and expanded fragmentary side view of the chair attachment of the **FIG. 6** embodiment;

**FIG. 11** is a partially cutaway and expanded fragmentary top view of the chair attachment of the **FIG. 10** illustration;

5        **FIG. 12** is a partially cutaway top view of the **FIG. 6** embodiment showing selectively lateral positioning and forward rotating of the joystick assembly;

**FIG. 13** is a partially cutaway and expanded fragmentary top view of the **FIG. 6** embodiment showing selectively linear and rotational positioning of the joystick assembly on the base rod;

10        **FIG. 14** is a partially cutaway side elevation view of the **FIG. 6** embodiment with a flush knob and having an attachment plate on the chair attachment;

**FIG. 15** is a partially cutaway and expanded fragmentary top view of the **FIG. 6** embodiment showing the attachment plate on the chair attachment;

**FIG. 16** is a partially cutaway and expanded fragmentary side view of the **FIG. 1** embodiment showing the attachment plate on the chair attachment;

**FIG. 17** is a partially cutaway side view of the **FIG. 6** embodiment having a resilient section in the latch;

**FIG. 18** is an inner side elevational view of the swivelling pivotal joystick holder with an extension mounted on a right arm of a wheelchair;

**FIG. 19** is a top view of the swivelling pivotal joystick holder in a fully-swivelled and pivoted position in line with the arm of a wheelchair;

**FIG. 20** is a top view of the swivelling pivotal joystick holder in a linearly extended position by itself; and

5        **FIG. 21** is a bottom view of the swivelling pivotal joystick holder in a fully swivelling pivoted position of **FIG. 19**.

### DESCRIPTION OF PREFERRED EMBODIMENT

Listed numerically below with reference to the drawings are terms used to describe features of this invention. These terms and numbers assigned to them designate the same features throughout this description.

- |                            |                        |
|----------------------------|------------------------|
| 1. Base bar                | 19. Lock-notch surface |
| 2. Base pivot              | 20. Pivot base         |
| 3. Chair attachment        | 21. Lock notch         |
| 4. Motorized chair         | 22. Latch              |
| 5. Joystick assembly       |                        |
| 6. Pivot axle              | 23. Latch aperture     |
| 7. Spring-pressured member | 24. Latch tip          |
| 8. Positional recess       | 25. Bar knob           |
| 9. Spring                  | 26. Actuator portion   |
| 10. Adjustment bolt        | 27. Latch knob         |
| 11. Lock cylinder          | 28. Flush knob         |
| 12. Attachment bar         | 29. Knob bay           |
| 13. Attachment plate       | 30. Fastener aperture  |
| 14. Fasteners              | 31. Assembly fastener  |
| 15. Fastener orifices      | 32. Slot               |
| 16. Armrest                | 33. Assembly knob      |
| 17. Approachable object    | 34. Resilient section  |
| 18. Stop                   | 35. First plate        |



- |                               |                                  |
|-------------------------------|----------------------------------|
| 36. Second plate              | 48. Electric Cable               |
| 37. Wheelchair arm            | 49. Vibration prevention donut   |
| 38. Arm extension             | 50. Joystick control attachment  |
| 39. First plate pivot         | holes                            |
| 40. First plate inner stop    | 51. Locking recess for 42        |
| 41. Lock cylinder             | 52. Locking recess for 44        |
| 42. First plate locking ball  | 53. Holding bar for attachment   |
| 43. Second plate inner stop   | arm                              |
| 44. Second plate locking ball | 54. Bottom channel in wheelchair |
| 45. Second plate pivot        | arm                              |
| 46. Joystick control          |                                  |
| 47. Joystick                  |                                  |

Referring to **FIGS. 1-5**, a pivotal joystick base has a base bar **1** with a pivot end and a base end. The pivot end is pivotal horizontally on a base pivot **2** that is affixed to a chair attachment **3** that is articulated for attachment to a motorized chair **4** predeterminedly. The base end is adapted to support a joystick assembly **5**. The base pivot **2** has a pivot lock for locking the base bar **1** in a pivoted position selectively.

In a first preferred embodiment, the base pivot **2** includes a pivot axle **6** that is oriented vertically on the chair attachment **3** for horizontal pivoting of the base bar **1**. The pivot lock includes a spring-pressured member **7** that is preferably a sphere or a ball which is spring-pressured upwards vertically into contact with an underside of the base bar **1** and into at least one positional recess **8** in the underside

of the base bar **1** for soft-locking the spring-pressured member **7** in the positional recess **8** at a pivotal position of the base bar **1** predeterminedly.

The spring-pressured member **7** is spring-pressured upwards vertically with a spring **9** having spring pressure variable with an adjustment bolt **10** having an axis that is collinear to an axis of the spring-pressured member **7** for entrance into the positional recess **8**. The spring-pressured member **7**, which is preferably a sphere or ball as shown, is positioned in a top portion of a lock cylinder **11** in which a preferably helical spring **9** is positioned below the spring-pressured member. The adjustment bolt **10**, preferably a recessed set-screw, is threaded into a bottom portion of the lock cylinder **11** for adjusting tension of the helical spring **9** against the spring-pressured member **7**.

The chair attachment can include an attachment bar **12** as shown in **FIGS. 1-2, 4-7, and 10-13**, or an attachment plate **13** with fasteners **14** in fastener orifices **15** as shown in **FIGS. 14-16**. The attachment bar **12** or the attachment plate **13** are articulated for being fastened to particular structures of the motorized chair **4** preferably and usually proximate an armrest **16** on either a left or a right side of the motorized chair **4**.

The pivotal joystick base allows the armrests **16** of the motorized chair **4** to be positioned closer to and quite often under an approachable object **17** which is

shown in dashed lines in **FIGS. 1-2**, and **4-7** to represent a table, desk, workstation, wall, door or other approachable object **17**. Usually, the joystick assembly **5** on a motorized chair **4** protrudes approximately six inches in front of the armrest **16**. This prevents a user of the motorized chair **4** from getting close enough to the table, desk, workstation, wall, door or other approachable object **17** to use it effectively. With the pivotal joystick base, the joystick assembly **5** can be swung, pushed or pivoted to a side or backwards where it is out of the way.

In the embodiments shown in **FIGS. 1-5**, the base bar **1** is soft-locked in a forward position from which there can be an easy breakaway laterally to a side or slightly backwards if desired. Preferably for most users, however, there is also a stop **18** on a bottom side of the base bar **1** as shown in **FIG. 5** for contacting the chair attachment **3** to prevent inward pivoting of the base bar **1** to a position of contact of the base end with a front portion of a user.

Referring to **FIGS. 6-15** and **17**, a second preferred embodiment has the pivot axle **6** extended upwards vertically from a lock-notch surface **19** on the chair attachment **3** for horizontal pivoting of the base bar **1** on the pivot axle **6** vertically above the lock-notch surface **19** which can be on a pivot base **20** on the chair attachment **3**. The lock-notch surface **19** includes a predetermined plurality of lock notches **21** positioned predeterminedly circumferential at a design notch distance

radially from the pivot axle **6**. The pivot lock includes a latch **22** that is movable upwardly and downwardly in a latch aperture **23** in the base rod **1** at the notch distance from the pivot axle **6**. The latch **22** includes a latch tip **24** that is positioned in a select one of the lock notches **21** for locking the base bar **1** in a selected pivotal direction from the pivot axle **6**. The latch tip **24** is removed from any of the lock notches **21** for pivoting the base bar **1** to a selected pivotal direction from the pivot axle **6**. The lock notches **21** are articulated to receive the latch tip **24** predeterminedly.

The latch **22** can include a latch actuator in a bar knob **25** that is affixable to a topside of the pivot end of the base bar **1**. The latch actuator can include internal fastener threads in the bar knob **25** and matching external threads in an actuator portion **26** of the latch **22**. The latch **22** can have a latch handle which can include a latch knob **27** for rotating the latch **22** in an upward-rotational direction to unscrew the latch tip **24** from any one of the lock notches **21** and for rotating the latch **22** in a downward-rotational direction to screw the latch tip **24** into a select one of the lock notches **21**.

As shown in **FIGS. 14-15**, the latch **22** can include a recessed flush knob **28** that is recessed in a knob bay **29** in the bar knob **25**.

The latch tip **24** is preferably conical and the lock notches **21** are matched conically for receiving the latch tip **24**.

As shown in **FIGS. 1-2**, the base bar **1** includes a fastener aperture **30** through which an assembly fastener **31** is inserted and tightened to position the joystick assembly **5** in a desired rotational direction for joystick control of the motorized chair **4**.

As shown in **FIGS. 7 and 12-14**, the base bar **1** can include a fastener aperture that is a slot **32** predeterminedly intermediate the latch end and the pivot end of the base bar **1** for positioning the joystick assembly **5** linearly along the base bar **1** selectively.

As shown in **FIG. 14**, the assembly fastener **31** can include an assembly knob **33** for hand-rotating the assembly fastener **31**.

Shown in **FIGS. 12-13** is forward rotational positioning of the joystick assembly **5** for control in any direction of rotation to compensate for rotation of the joystick assembly **5** resulting from pivotal positioning of the base bar **1** in combination with linear positioning of the joystick assembly **5** along the base bar **1** selectively.

As shown in **FIG. 17**, the latch **22** can include a resilient section **34** that is affixed to the latch **22** and to the actuator portion **26** at oppositely disposed ends of

the resilient section **34** respectively for inserting the latch tip **24** into and removing it from the latch notches **21** selectively by rotation of the latch knob **27**. This allows spring-pressured downward travel of the latch tip **24** for finding a latch notch **21** while the base bar **1** is being pivoted in a desired rotational position for the joystick assembly **5**. It also provides rigid pivotal positioning of the joystick assembly **5** for its control operation wherever desired within a pivotal range.

Referring to **FIG. 18**, the swivelling pivotal joystick base is shown to have two plates **35** and **36** which are pivotally connected at a second plate pivotal **45** at the distal end of the first plate **35**. The first plate is attached to a first plate pivot **39** inward of a distal end of an arm extension **38** which extends from and is attached to a wheelchair arm rest **37**. The first plate **35** is locked in a normal forward use position as shown by a locking ball **42** which is spring mounted within a lock cylinder **41** and which fits into a locking recess **51** on a bottom of a first plate. The second plate **36** is locked in the normal use position by a locking ball **44**, which like the first plate locking ball **42** extends into a recess **52** in the bottom of the respective plates as is illustrated and described hereinafter. The joystick control **46** is attached to the top of the second plate **36** so that the user has access to the joystick **47**. The electric cable carrying the instructions from the joystick control **46** is shown in partial view as **48**. The two pivoting plates **35** and **36** are prevented from rotating

too far inward by a first plate inner stop **40** which is attached by a bolt to a distal end of the attachment plate **38** and a second plate inner stop **43** which is attached under the first plate and extends upward to abut the second plate **36**. The device as shown can be attached to either the right arm of the wheelchair or to the left arm of the wheelchair by merely changing the location of the inner stops **40** and **43** to the opposite side of the attachment arm and plate.

**FIG. 19** shows the joystick base of the present invention when it is fully pivoted and swivelled to a position in alignment with the arm **37** of the wheelchair. In this position the joystick controls **46** and **47** are locked in the same normal use orientation as shown in **FIG. 18**, which is important in that it helps to prevent the user from inadvertently moving the joystick **47** in the wrong direction, thereby directing the chair into a table against which the user is sitting or in another direction which could result in injury. Thus, in this position the second plate **36** lies under the joystick controls **46**. Further remaining elements shown in **FIG. 19** are previously discussed in relation to **FIG. 18**.

In **FIG. 20** the entire swivelling pivotal joystick base is illustrated from the top position without the joystick. In this view, the arm attachment **38** is shown as having a donut **49** on an inner end which fits in the channel of the wheelchair and dampens lateral movement. This donut would likely be made of rubber **49**. The

first plate **35** is attached to the extension arm **36** by the first plate pivot **39** and rests against the inner stop **40**. The second plate inner stop **43** is shown on the inner side of the first plate **35**. A locking ball **44** for the second plate **36** is contained on top of the first plate **35**. The second plate **36** is pivotally attached at the pivot **45**. Attachment holes **50** for mounting the joystick controls **46** are also shown.

**FIG. 21** shows the swivelling pivotal joystick base mounted in a channel **55** under the wheelchair arm **37** as it would appear from the bottom in the fully swivelled and pivotal position shown in the top view of **FIG. 19**. Other additional features shown in **FIG. 21** include the holding bar **54** for movable extension arm **38**. Also, the locking recess **51** for the first plate locking ball **42** on the top side of the lock cylinder **41** is shown. Further the locking recess **53** for the second plate locking ball **44** is also shown.

A new and useful pivotal joystick base having been described, all such foreseeable modifications, adaptations, substitutions of equivalents, mathematical possibilities of combinations of parts, pluralities of parts, applications and forms thereof as described by the following claims and not precluded by prior art are included in this invention.